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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,095	10/29/2003	Vladimir Grushin	PE0649USDIV5	6624
23906	7590	06/28/2005	EXAMINER	
E I DU PONT DE NEMOURS AND COMPANY LEGAL PATENT RECORDS CENTER BARLEY MILL PLAZA 25/1128 4417 LANCASTER PIKE WILMINGTON, DE 19805			KIELIN, ERIK J	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/696,095

Applicant(s)

GRUSHIN ET AL.

Examiner

Erik Kielin

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 12-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/29/03 10/12/04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement filed 12 October 2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because some of the references have not been provided with dates in accordance with 37 CFR 1.98(b)(5). Also the MPEP 609 states,

“Each publication must be identified by publisher, author (if any), title, relevant pages of the publication, and **date** and place of publication. The date of publication supplied must include at least the **month and year** of publication, except that **the year of publication (without the month) will be accepted if the applicant points out in the information disclosure statement that the year of publication is sufficiently earlier than the effective U.S. filing date and any foreign priority date so that the particular month of publication is not in issue.**” (Emphasis added.)

The IDS has been placed in the application file, but only the references initialed by Examiner have been considered. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2813

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication 2002/0182441 A1 (**Lamansky et al.**) in view of the article **Dedeian et al.** "A new synthetic route to the preparation of a series of strong photoreducing agents: *fac* tris-othro-metalated complexes of iridium(III) with substituted 2-phenylpyridines" Inorganic Chemistry, Vol. 30, 1991, 1685-1687 and WO 00/70655 (**Baldo et al.**).

Regarding claims 12-14, **Lamansky** discloses iridium (Ir) metal complexes for use in electroluminescent devices. An exemplary similar complex is shown in Fig. 7d having the following ligands: (1) two fluorine-substituted 2-phenylpyridines; (2) triphenylphosphine, and (3) chlorine. Each of the phenyl and pyridine rings of the 2-phenylpyridines are shown more generally to be substituted by as shown in Figs. 5a and 5b. Note also that each phenyl group of the triphenylphosphine is also generally substituted as shown in Fig. 6b. The substituents are, *inter alia*, halogen (e.g. fluorine) and alkyl.

**Lamansky** states in paragraph [0049],

"The at least one mono-anionic, bidentate, carbon-coordination **ligand** of the present invention is **substituted with electron donating and/or electron withdrawing substituents that shift the emission**, relative to the un-substituted ligand, to either the blue, green or red region of the visible spectrum. The **particular substituents used on particular ligands will depend upon the desired shift in emission**. Generic representative examples of the at least one mono-anionic, bidentate, carbon-coordination ligand of the present invention are listed in FIGS. 5a, 5b and 5c." (Emphasis added.)

Accordingly, **Lamansky** suggests using various halogen and alkyl substituents to modify the emission wavelength of the Ir metal complex. **Lamansky** does not however, specifically indicate

Art Unit: 2813

that the alkyl is specifically trifluoromethyl on either of the 2-phenylpyridines or the phosphine (claim 13 only). Note however that **Lamansky** gives a specific example of the alkyl-substituted phenylpyridine as a methyl-substituted phenylpyridine in Fig. 5b.

**Dedeian**, like **Lamansky**, discloses electroluminescent phenylpyridine ligands for Ir. **Dedian** shows in the upper, right-hand corner of p. 1686, Table I, that phenyl pyridine can be substituted with either a methyl (as in one example in **Lamansky**) or trifluoromethyl.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use trifluoromethyl as the substituent on each of the 2-phenylpyridines and the triphenylphosphine ligands because, as noted above, **Lamansky** suggests using various halogen and alkyl substituents to modify the emission wavelength of the Ir metal complex, and **Dedian** teaches the trifluoromethyl is a known substituent for ligands of Ir metal complexes. Importantly, the **Lamansky** and **Dedian** references share a common author, Peter Djurovich, such that one of ordinary skill would also be aware that each group was aware the alkyl in **Lamansky** suggests fluoroalkyl substituents as well.

**Lamansky** does not locate the substituent groups F and CF<sub>3</sub> on the phenylpyridine ligands that match those selected locations from Table 1 of the instant specification, as claim 14 has been amended to claim but indicates that they may be located anywhere on the rings.

**Baldo**, like each of **Lamansky** and **Dedeian** discloses substituted phenylpyridine ligands for Ir, and teaches that the substituent groups can be located in any position on either ring of the phenylpyridine ligand. **Baldo** indicates that altering the substituents of the ligands beneficially “give different color emission,” “different carrier transport,” and “alter the emissive properties” (**Baldo**, pp. 14-15).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to locate the substituents of **Lamansky** at each specific location on the phenylpyridine ligand and on the triphenylphosphine ligand, in order to beneficially affect the emissive properties of the Ir complex, as taught to be beneficial in **Baldo**, thereby giving a wider range of colors. Note also that **Lamansky** and **Baldo** share several common inventors, such that one of ordinary skill would also be aware that the location on the ligand, as well as the substituent identity, affects the emission wavelength of the Ir metal complex.

Regarding claim 15, **Lamansky** discloses that the iridium complexes are used in the light-emitting layer of an electronic, light-emitting device (Figs. 18(a) and (b), paragraph [0013], [0128], and [0129]).

Regarding claim 16, because the light-emitting layer is the location where electrons and holes charges are transported to recombine with the emission of light. The light-emitting layer is a charge transport layer because the charges must move through the light-emitting layer in order to recombine.

### *Conclusion*

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent Application Publication 2002/0048689 A1 (**Igarashi** et al.) discloses iridium (Ir) metal complexes for use in electroluminescent devices. Formula (3) on p. 5 gives a general formula. General formula (3) shows the following ligands: (1) fluorine-substituted 2-


Art Unit: 2813

phenylpyridines (paragraphs [0057], [0069]); (2) the  $R^{31}$  may be phenyl thereby giving a triphenylphosphine, and (3)  $L^{31}$  may be chlorine.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached from 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erik Kielin  
Primary Examiner  
June 26, 2005